PEPWAVE

User Manual

Pepwave Surf Indoor Series:

Surf mini

Surf 400

Pepwave Surf DX Series:

400-DX

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June 10

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Table of Contents

1 COPYRIGHT 3
2 DISCLAIMER 3
3 PRODUCT DESCRIPTION 4
3.1 PRODUCT FEATURES 4
3.2 HARDWARE SETUP 5
3.3 LED DESCRIPTION 6
4 USING THE PEPWAVE DEVICES 9
4.1 PRE-CONFIGURING PC SETUP 9
4.2 FIRST TIME SETUP 10
5 CPE SETTINGS DETAILS 14
5.1 IP SETTINGS 14
5.2 RADIO SETTINGS 15
5.3 WIRELESS SETTINGS 16
5.4 ROAMING SETTINGS: 17
5.5 WIRELESS IP SETTINGS 18
5.6 RESTORE AND REBOOT 19
5.7 INTEGRATED WI-FI ACCESS POINT CONFIGURATION 20
6 PORT FORWARDING 23
7 QOS 25
8 FIRMWARE UPGRADE 26
9 DEBUG AND SYSTEM INFORMATION 27
10 RESTORE TO DEFAULT SETTINGS 29
10.1 SURF INDOOR SERIES 29
10.2 SURF DX SERIES 29
APPENDIX 30

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1 Copyright

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3 Product Description

3.1 Product Features

- Signal strength LED for showing the current signal strength
- Always-on, integrated Wi-Fi access point
- WPA/WPA2-Personal and WPA/WPA2-Enterprise security support
- Wi-Fi Multimedia (WMM) support
- Built-in DHCP server and NAT routing to manage client devices
- Customizable, built-in web portal for simple web-based configuration

Surf mini

Surf 400

Surf 400-DX

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3.2 Hardware Setup

3.2.1 Surf mini Series

1. Attach the provided antenna to the right most antenna connector
2. Connect the LAN port to the computer's Ethernet port with an Ethernet cable.
3. Connect the end of the included power adapter to the power socket on Pepwave Surf mini.
4. Power on the power adaptor.

3.2.2 Surf 400 Series

1. Attach the provided antenna to the left most antenna connector
2. Connect the LAN port to the computer's Ethernet port with an Ethernet cable.
3. Connect the end of the included power adapter to the power socket (labeled "DC 12V") on Pepwave Surf.
4. Power on the power adaptor.

3.2.3 Surf DX Series

Please follow the installation guide to set up the Pepwave Surf 400-DX.

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3.3 LED Description

3.3.1 Surf mini Series

LED	Color	Status	Description
PWR	Green	On	Power is on
		Off	Power is off
RDY	Green	On	Device is booted
		Off	Device is not booted
ENET	Green	On	Ethernet is connected
		Blinking	Sending/Receiving data
		Off	Ethernet is not connected
	Green	On	Associated with an access point
		Back-and-forth	Searching access point
		Blinking	Acquiring IP address
		Off	Not associated with any access point
		Number of LED	The number of lit signal bars depends on the strength of the received signal. A larger number of lit signal bars indicate stronger signals.

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3.3.2 Surf 400 Series

LED	Color	Status	Description
Power	Green	On	Power is on
		Off	Power is off
Status	Green	Solid	Received signal is Excellent, Very Good and Good
	Green	Blinking	Received signal is Low
	Amber	Blinking	Received signal is Very Low
	Amber	Solid	No wireless signal is detected
		Off	Booting up / Upgrading firmware
LAN	Green	On	Ethernet is connected
	Green	Blinking	Sending/Receiving data
		Off	Ethernet is not connected
Wi-Fi	Green	On	Associated with an access point
	Green	Blinking	Sending/Receiving data
		Off	Not associated with any access point
Signal Bars	Green	N/A	The number of lit signal bars depends on the strength of the received signal. A larger number of lit signal bars indicate stronger signals.

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3.3.3 Surf DX Series

LED	Color	Status	Description
PWR	Green	On	Power is on
		Off	Power is off
LAN	Green	On	Ethernet is connected
		Off	Ethernet is not connected
Wi-Fi	Green	On	Associated with an access point. The number of LED lights from “MIN” to “MAX” indicates the received signal strength level.
		Off	Not associated with any access point

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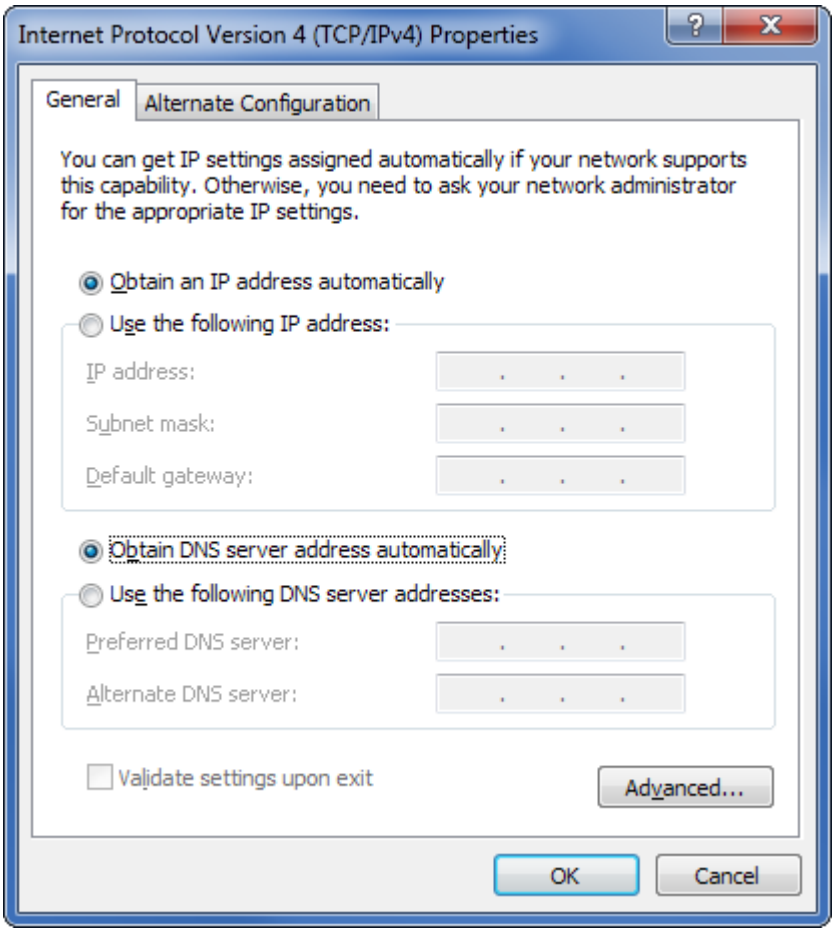
4 Using the Pepwave Devices

4.1 Pre-configuring PC Setup

You should set up your computer's LAN interface to **obtain an IP address automatically**.

In order to do so, select the ***Start menu > Control Panel*** > ***Network Connections***. Right click on the ***Local Area Connection*** icon, choose ***Properties***, and double-click on the item **Internet Protocol (TCP/IP)** from the list. On the screen, just set it as follows:


Internet Protocol Version 4 (TCP/IPv4) Properties
General
Alternate Configuration
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
Subnet mask:
Default gateway:
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Validate settings upon exit
Advanced...
OK
Cancel

Click the **OK** button to confirm the change.

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4.2 First Time Setup

On your PC, start a web browser, e.g. Internet Explorer, Mozilla Firefox, etc. Visit an Internet web site. If you are not associated to an access point, you should be redirected to a logon page. Or you can go to the following URL:

http://192.168.20.1/

The page will look like this.

Pepwave Wireless Broadband Modem
Please click the Advanced Config button for configuration and then click the Connect button to establish wireless Internet connection
Advanced Config
Connect!
Surf AP 200 / 9.0.33

Illustration 1: Welcome Page

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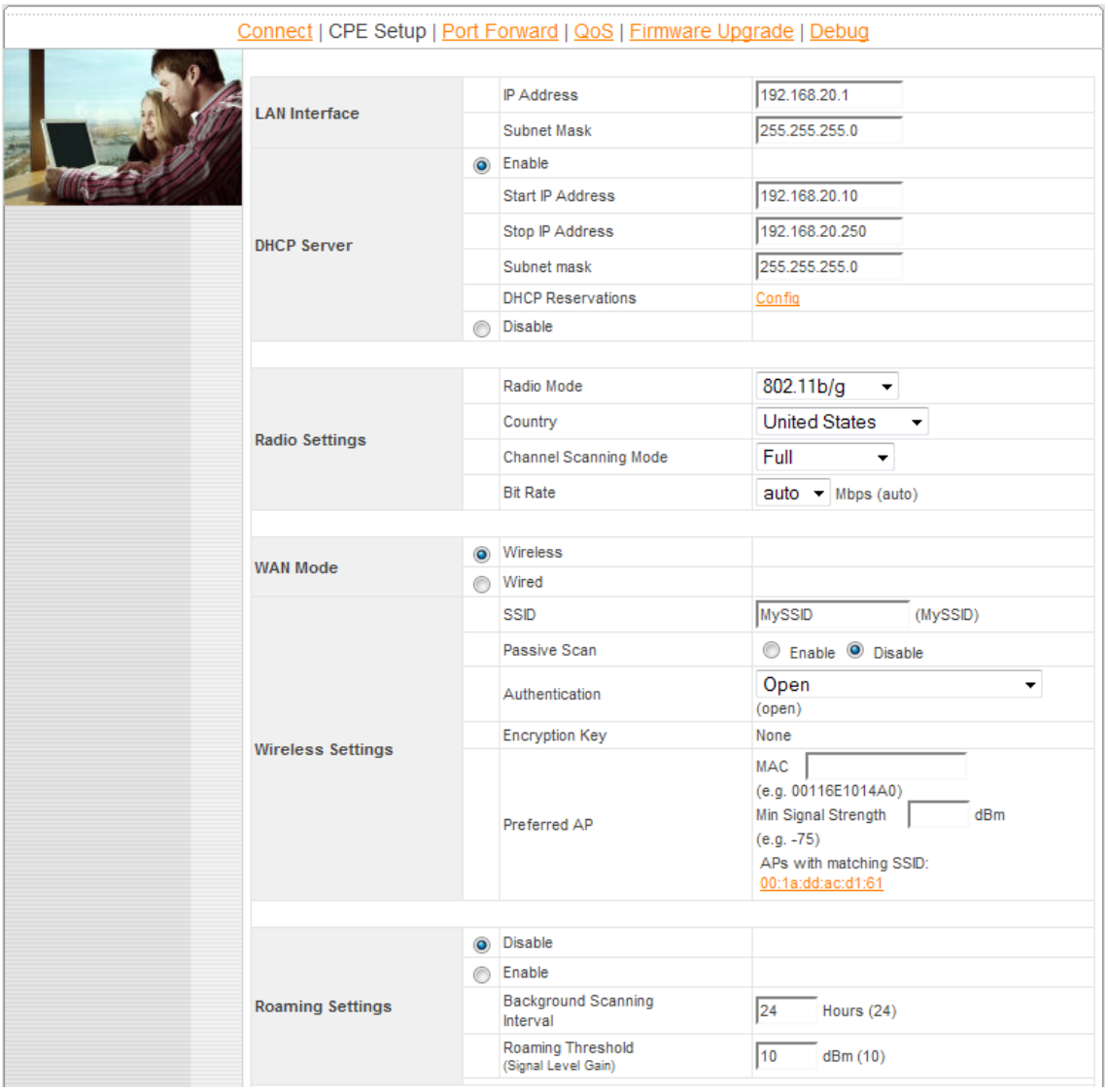
Click the **Advanced Config** button to enter the parameters of the access point to associate to. You should see this screen:



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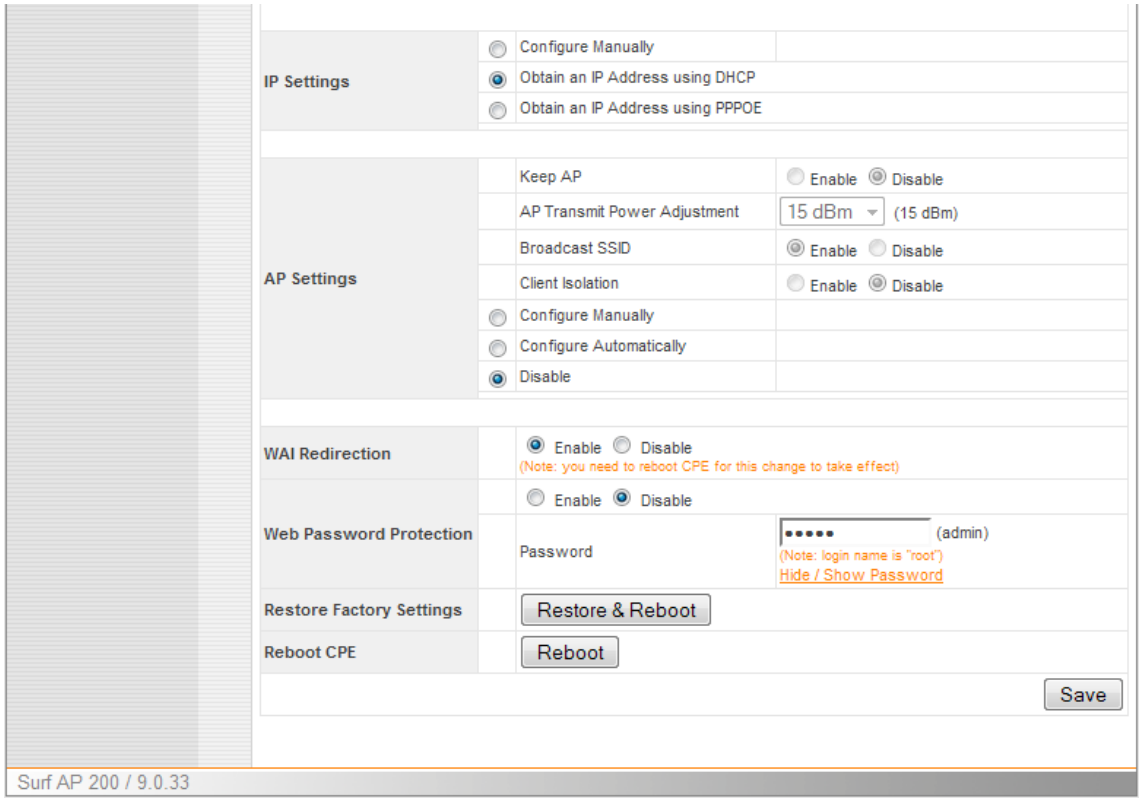

Illustration 2: Pepwave Surf Setup Page

In the field **SSID** under **Wireless** Settings, input the access point's SSID (sometimes it is called the "network name"). According to the setting of the Access Point you are associating to, you may choose a different **Authentication** setting.

If **Static WEP key** or **WPA/WPA2-Personal** is selected for **Authentication**, input the Encryption Key field as well. (There are also options of **802.1x with dynamic WEP key** and **WPA/WPA2-Enterprise**. You do not need to use these settings unless instructed to do so by your ISP.)

Click the **Save** button at the bottom to complete.

You can now click the **Connect** link on the top bar and then click the **Connect** button to associate with the access point.

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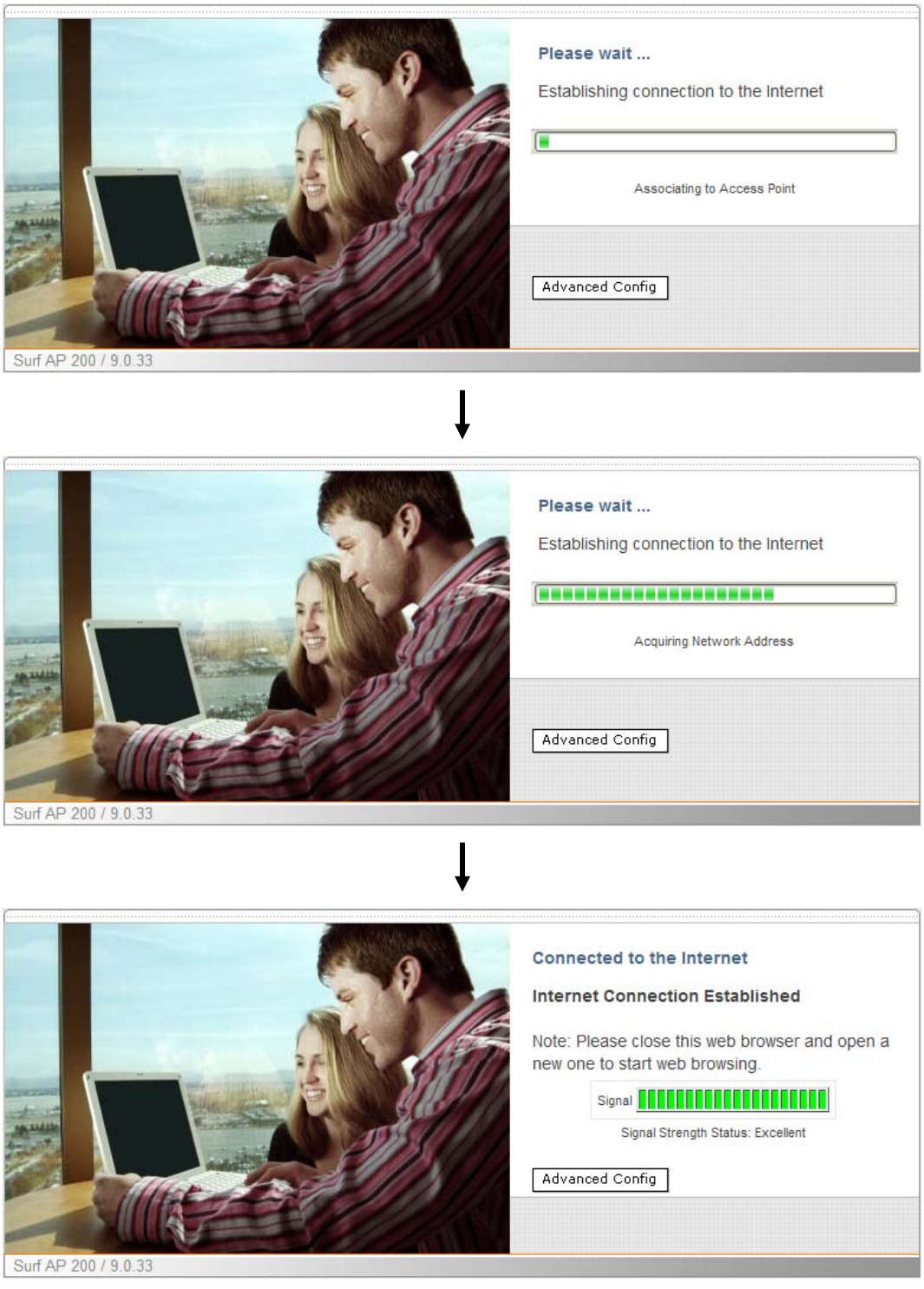
Please wait ...
Establishing connection to the Internet
Associating to Access Point
Advanced Config
Surf AP 200 / 9.0.33
Please wait ...
Establishing connection to the Internet
Acquiring Network Address
Advanced Config
Surf AP 200 / 9.0.33
Connected to the Internet
Internet Connection Established
Note: Please close this web browser and open a new one to start web browsing.
Signal
Signal Strength Status: Excellent
Advanced Config
Surf AP 200 / 9.0.33

Illustration 3: Establishing Connection to the Internet

At this point, you are associated with the access point. You may now close the web browser and open a new one to start web browsing.

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5 CPE Settings Details

5.1 IP Settings

Illustration 4: IP Settings

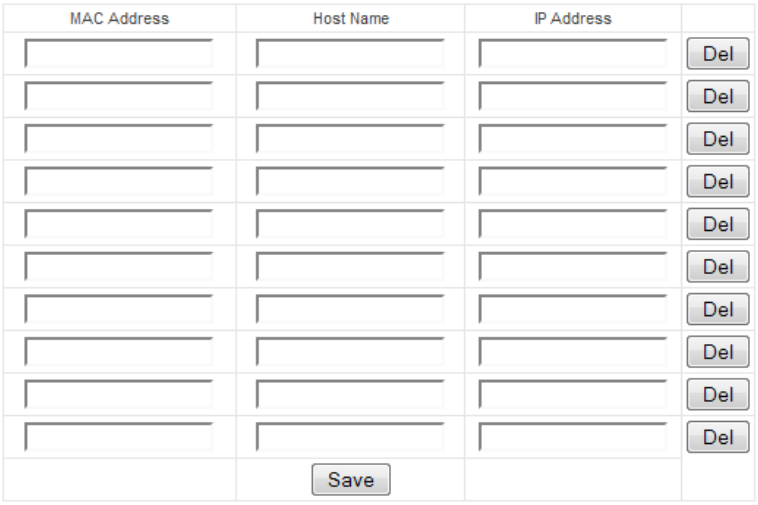

Illustration 5: DHCP Reservations

IP Settings	
LAN Interface	To configure the LAN interface's IP address and subnet mask.
DHCP Server	To configure and enable the built-in DHCP server or not. If enabled, the IP address range can be configured. Configure DHCP Reservation if there is a need to assign a specific IP address to a specific MAC address using DHCP.

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5.2 Radio Settings

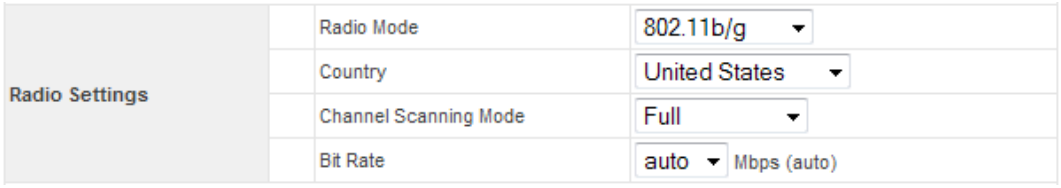

Illustration 6: Radio Settings

Radio Settings	
Radio Mode	It allows the user to choose between radio modulations support: **802.11b/g**, **802.11g** only, **802.11b** only, etc. The available settings depend on the Wi-Fi module installed on the device.
Country	Select a country location where you are using the device. Available channels and output power would be adjusted accordingly.
Channel Scanning Mode	To select different channels that preferred to scan. If **Single** is selected, the option **Scanned Channel** would be shown.
Bit Rate	Available options depend on the Radio Mode chosen. If auto is chosen, the device will choose the best bit rate dynamically and automatically.

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5.3 Wireless Settings

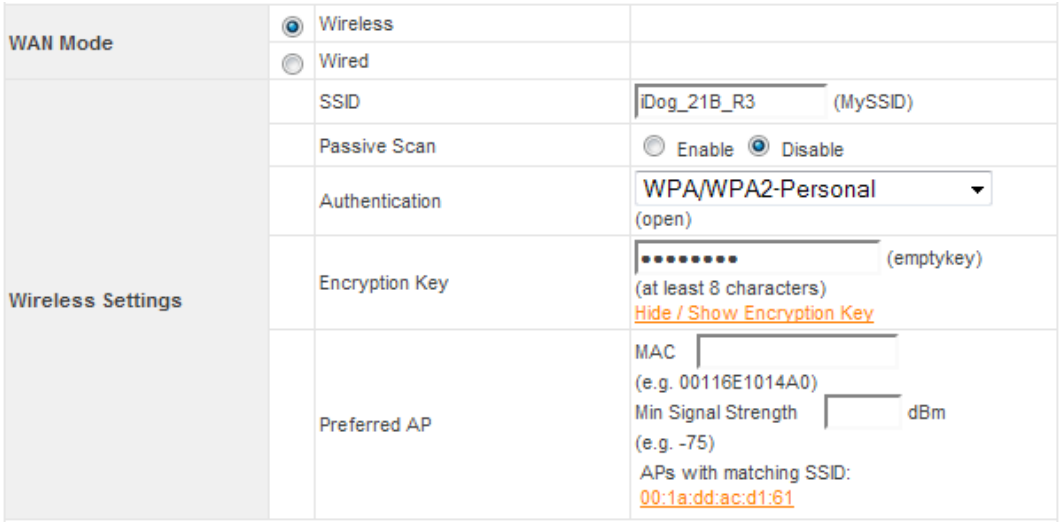

Illustration 7: Wireless Settings

Wireless Settings	
WAN Mode	This option specifies your Internet connection source. Select **Wireless** if you are using the device as a Wi-Fi receiver. Select **Wired** if you are using the device as a standard Access Point.
SSID	To configure the Network Name of the wireless network to associate with.
Passive Scan	Select **Enable** and the wireless WAN will only do passive scan.
Authentication	Available options are **Open**, **Static WEP Key**, **802.1x with dynamic WEP key**, **WPA/WPA2-Enterprise** and **WPA/WPA2-Personal**. The selection should be according to the setting of the access point you are associating to. Data transferred are encrypted under all modes except in Open mode. When Static WEP Key or WPA/WPA2-Personal is chosen, you should enter an encryption key in the Encryption Key field. You do not need to use 802.1x and WPA/WPA2-Enterprise unless instructed to do so by your ISP.
Preferred AP	The MAC address of a preferred access point can be entered here. When the preferred access point is found and its signal strength is higher than the Min Signal Strength, it will connect to this preferred access point, no matter the other access points are found even they have higher signal strength or the same SSID.

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5.4 Roaming Settings:

Illustration 8: Roaming Settings

Roaming Settings	
Roaming Settings	To configure and enable roaming among APs with the same SSID and authentication method.
Background Scanning Interval	The time interval between background scans.
Roaming Threshold (Signal Level Gain)	If there is another AP with a signal level greater than the signal level of connected AP by the specified value, it will reconnect to the AP with better signal.

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5.5 Wireless IP Settings

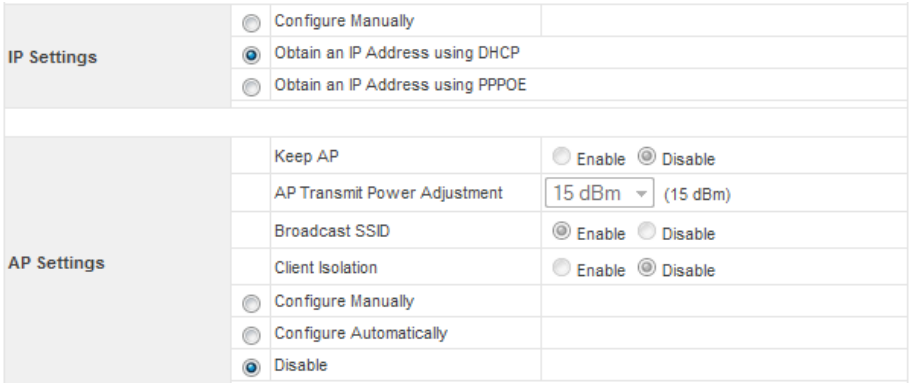
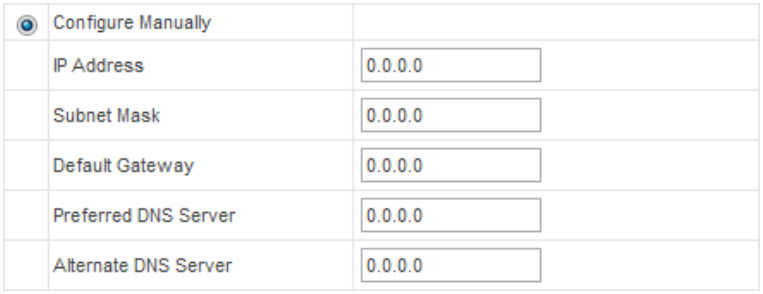
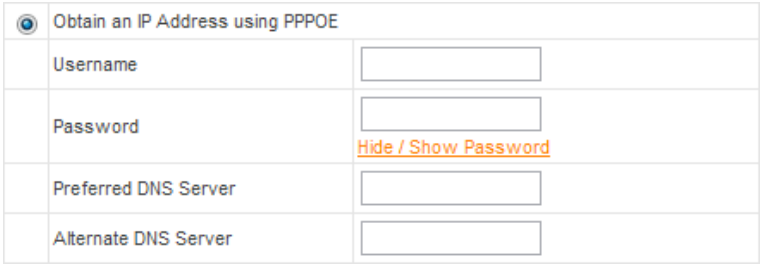


Illustration 9: Wireless IP Settings

Wireless IP Settings	
IP Settings	The IP address can be obtained automatically or **configured manually**. If you choose to manually configure the IP address for your unit, enter the fields IP Address, Subnet Mask, Default Gateway, Preferred DNS Server and Alternate DNS Server.  Select **Obtain an IP Address using DHCP** and the device will obtain an IP from the DHCP server automatically. Or select **Obtain an IP Address using PPPOE** and enter the fields for PPPOE connection. 
AP Settings	The AP Settings will be covered in detail in the subsequent section Integrated Wi-Fi Access Point Configuration.

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5.6 Restore and Reboot

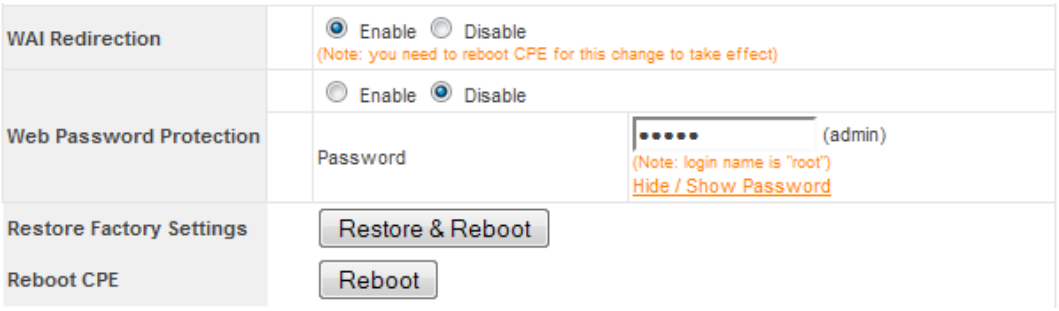

Illustration 10: Restore and Reboot

Restore and Reboot	
WAI Redirection	If the device is not connected to an access point, and the user is accessing an Internet web site, the settings control whether to redirect the web access to the web admin interface page or not. If this is disabled and the device is not connected, the browser will show a web access error message. The user can still access the web admin interface by accessing to the device's LAN IP address. By default, the LAN IP address is set as **http://192.168.20.1**.
Web Password Protection	Select Enable and sets the Password to protect the web user interface. By default, the login account is set as **root** and password is set as **admin**.
Restore Factory Settings	When this option is clicked, default settings will be restored and the unit will be restarted.
Reboot CPE	Click this button to restart the device.

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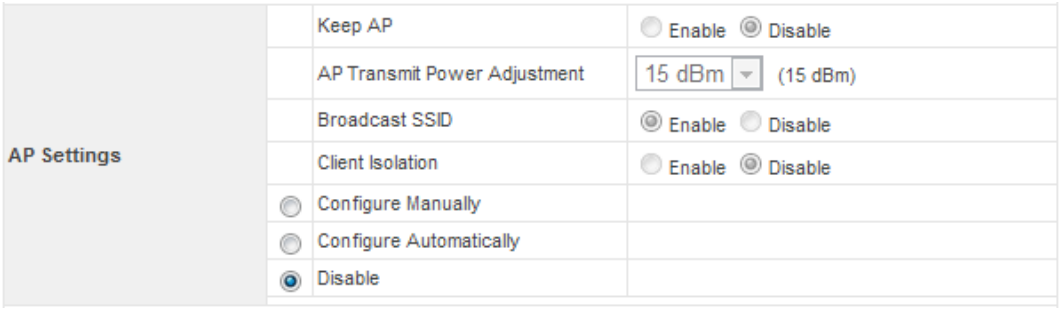
5.7 Integrated Wi-Fi Access Point Configuration

Integrated Wi-Fi Access Point is configured via the ***CPE Setup*** tab. The following sections will provide information as a guide through the configuration.

The available Access Point (AP) settings for the Integrated Wi-Fi Access Point functionality are as follows:

- **Disable**
  Integrated Wi-Fi Access Point functionality is disabled.
- **Configure Manually**
  Manual configuration of the SSID, Authentication, and Encryption Key values corresponding to the Access Point.
- **Configure Automatically**
  The SSID, Authentication, and Encryption Key values corresponding to the Access Point are automatically configured to be the same as the respective values that correspond to the ISP's network.



5.7.1 Access Point Settings

AP Settings	
Keep AP	With this option enabled, the Wi-Fi Access Point will always on even if there is no connection to the Internet connection source.
AP Transmit Power Adjustment	An option to retain a lower power setting for indoor home devices. Available options depend on the radio power of the device.
Broadcast SSID	With this option enabled, the configured SSID will be broadcast such that it can be detected by an SSID scan. Otherwise, the configured SSID will not be broadcast such that it cannot be detected by an SSID scan. In order to connect with the access point, the SSID needs to be known by the client.
Client Isolation	Prevent wireless clients connected to the AP from communicating with each other.

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5.7.2 Access Point Disabled

Access Point feature will be disabled when **Disable** is selected.

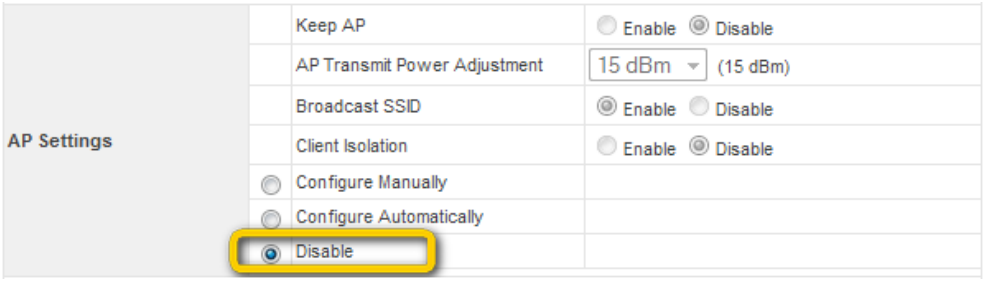

Illustration 11: Access Point Disabled

5.7.3 Access Point configure Manually

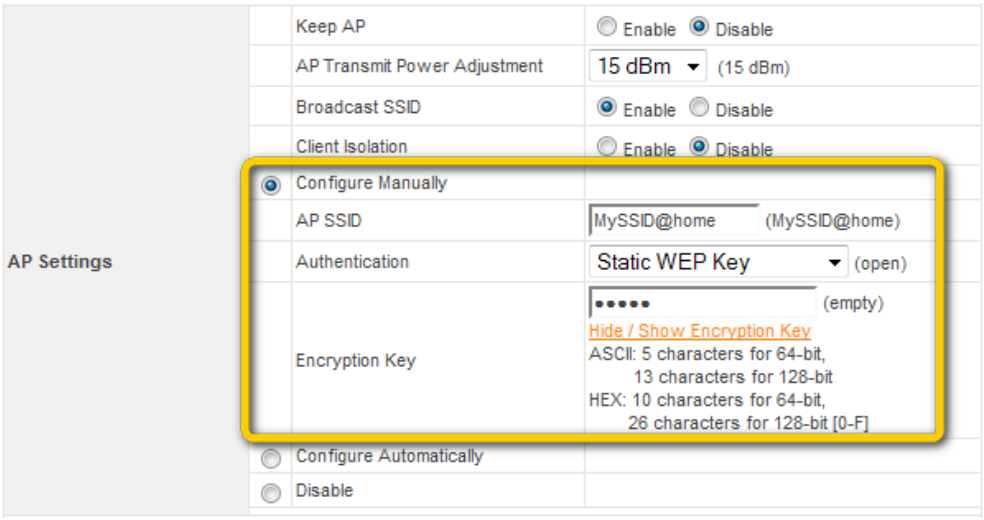

Illustration 12: Access Point Configure Manually

Configure Manually	
AP SSID	In Manual Configuration mode, the SSID is manually entered.
Authentication	It can be one of three configurable values: • **Open** No Encryption Key is necessary. • **Static WEP Key** A 64- or 128-bit Encryption Key is required, and can be entered in either an ASCII or HEX representation. • **WPA/WPA2-Personal** An Encryption Key, of at least 8 characters, is required.

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5.7.4 Access Point Configure Automatically

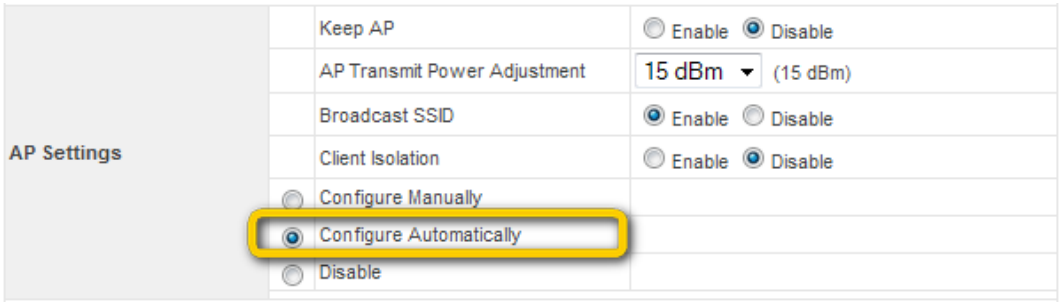

Illustration 13: Access Point Configure Automatically

With the Access Point Configuration set to **Configure Automatically**, the **SSID**, **Authentication**, and **Encryption Key** values of the Integrated Wi-Fi Access Point will be configured to be the same as in the ***Wireless IP Settings*** section.

Important Note

In the **Wireless Settings** section, if **Authentication** is set to either 802.1x with dynamic WEP key or WPA/WPA2-Enterprise, then the Configure Automatically option of the **Access Point Configuration** becomes unavailable, because the Integrated Wi-Fi Access Point functionality currently does not support authentication via the 802.1x with dynamic WEP key and WPA/WPA2-Enterprise methods.

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6 Port Forwarding

Port Forwarding Settings	
Service Port Range	Enter a port or a range of ports that would like to forward.
Protocol	The Protocol for the above port(s) forwarding. You should select at least one protocol between TCP and UDP.
IP Address	The IP address that you would like the traffics forwarded to.
Del	By clicking the button, you can delete the corresponding rows of port forwarding rules.

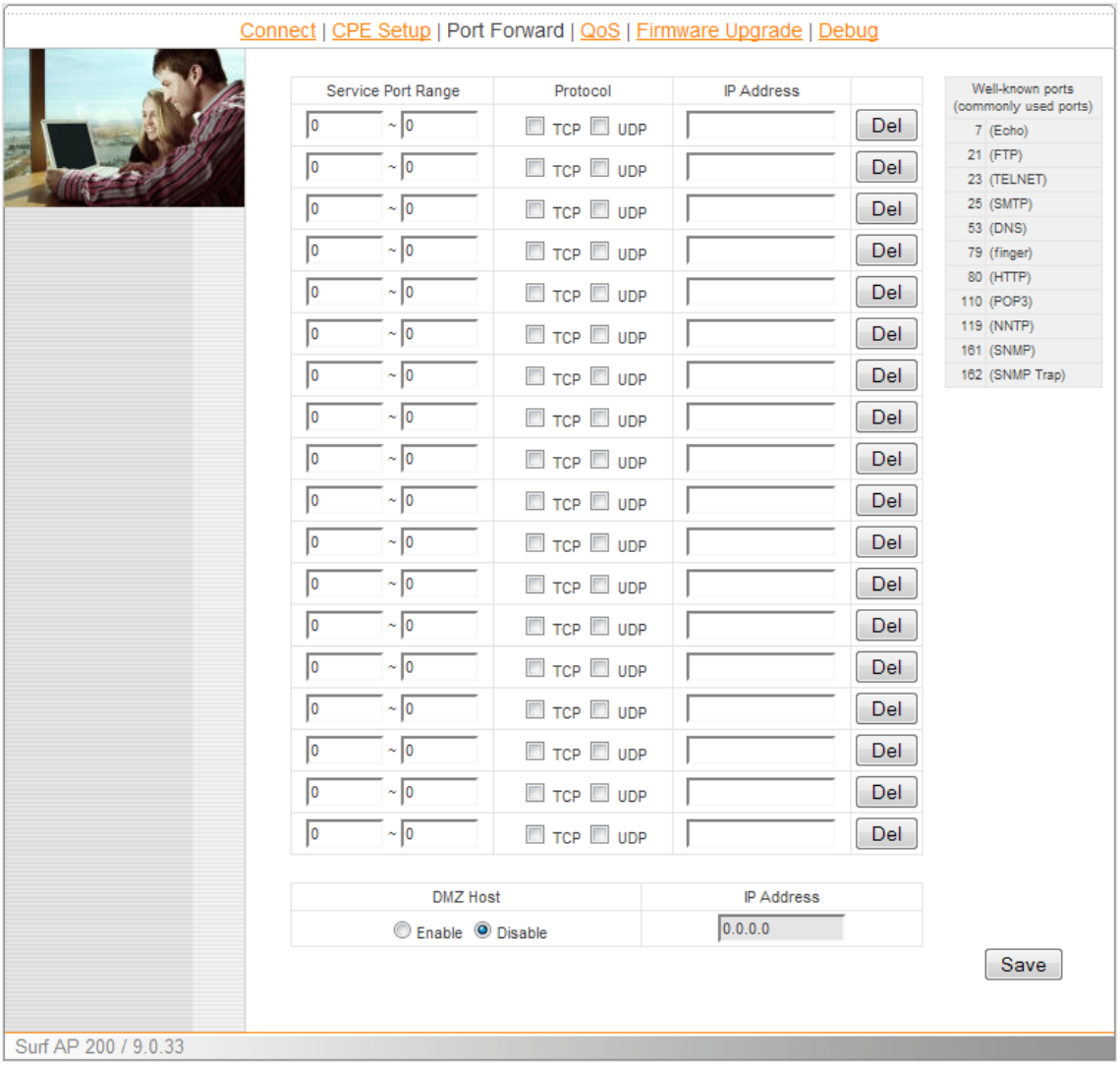

Illustration 14: Port Forwarding

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Below the port forwarding table is an option called **DMZ Host**. If you **Enable** this function, your Pepwave Surf will become a DMZ device. You can enter an IP address, which will be the IP address of the device that expose to the Internet. The purpose of a DMZ is to make all external users can has access to any ports of the device, so that user do not need to set up port forwarding and internet traffics can directly reach internal devices.

Tip

Below is a table showing some well-known ports, which is officially registered with IANA.

Port Number	Description	Protocol
7	Echo	TCP, UDP
21	FTP	TCP
23	TELNET	TCP
25	SMTP	TCP, UDP
53	DNS	TCP, UDP
79	Finger	TCP
80	HTTP	TCP, UDP
110	POP3	TCP
119	NNTP	TCP
161	SNMP	TCP, UDP
162	SNMP Trap	TCP, UDP

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7 QoS

QoS Settings	
Target	To choose whether it is an incoming **(Source)** or outgoing **(Destination)** traffic that should be controlled by the service.
Service Port Range	Enter a port or a range of ports that would like to be controlled by the service.
Protocol	The Protocol for the above port(s). You should select at least one protocol between **TCP** and **UDP**.
IP Address	The IP address that you would like the traffics to be controlled by the service.
Priority	There are three choices for service priority: **Background, Video** and **Voice**. By choosing **Default**, priority will be automatically adjusted.
Del	By clicking the button, you can delete the corresponding rows of port forwarding rules.

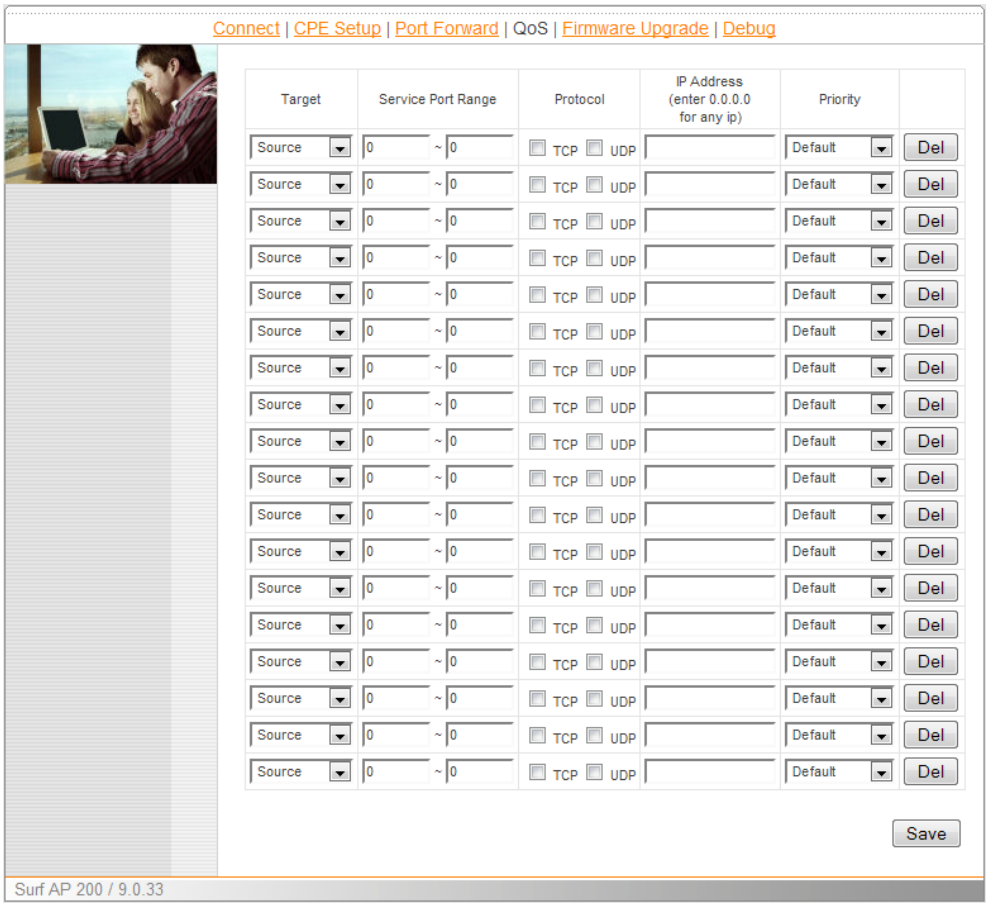

Illustration 15: QoS

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8 Firmware Upgrade

The Pepwave devices are able to check whether a newer firmware (the software running on the unit) is available.

However, it is recommended that you do not update the firmware unless specifically instructed by your ISP to do so. When a firmware upgrade is needed, your ISP will either give you instructions or they will upgrade the firmware remotely.

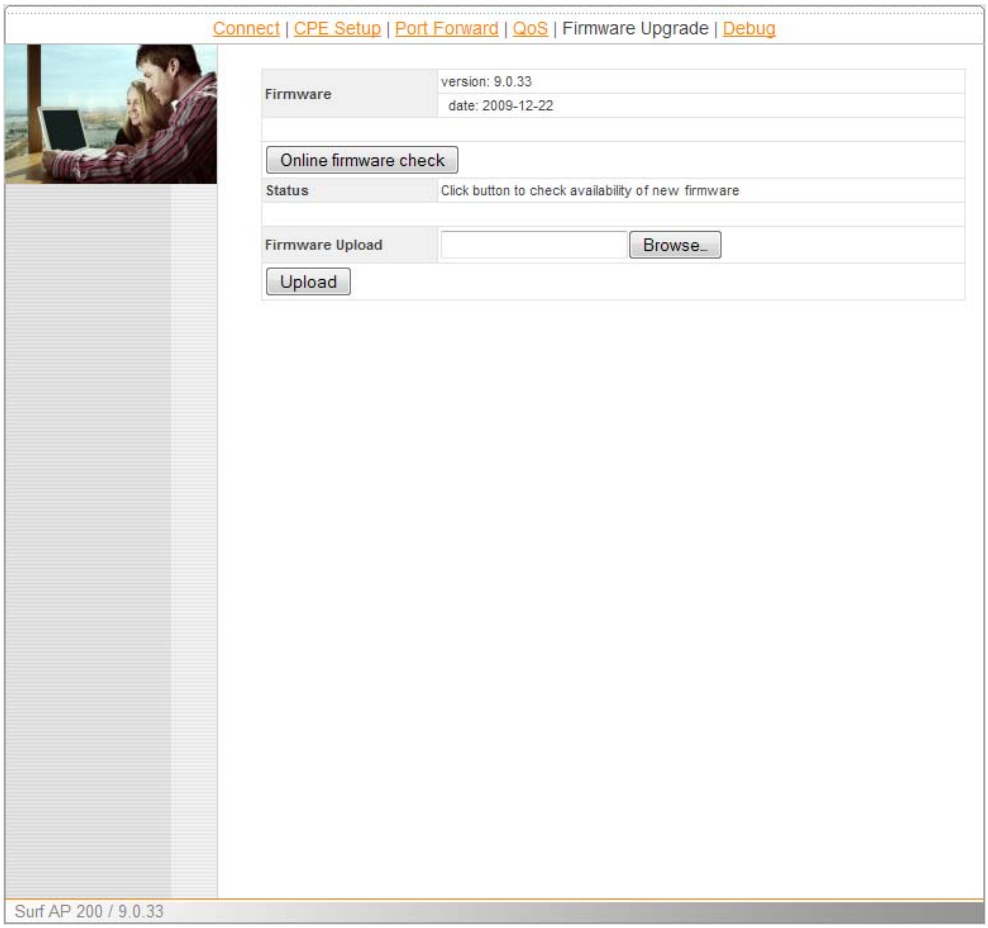

Illustration 16: Firmware tab showing the system information

Tip
It is highly recommended users to download the configuration file (download directory can be found in the next section) for backup propose before doing firmware upgrade.

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9 Debug and System information

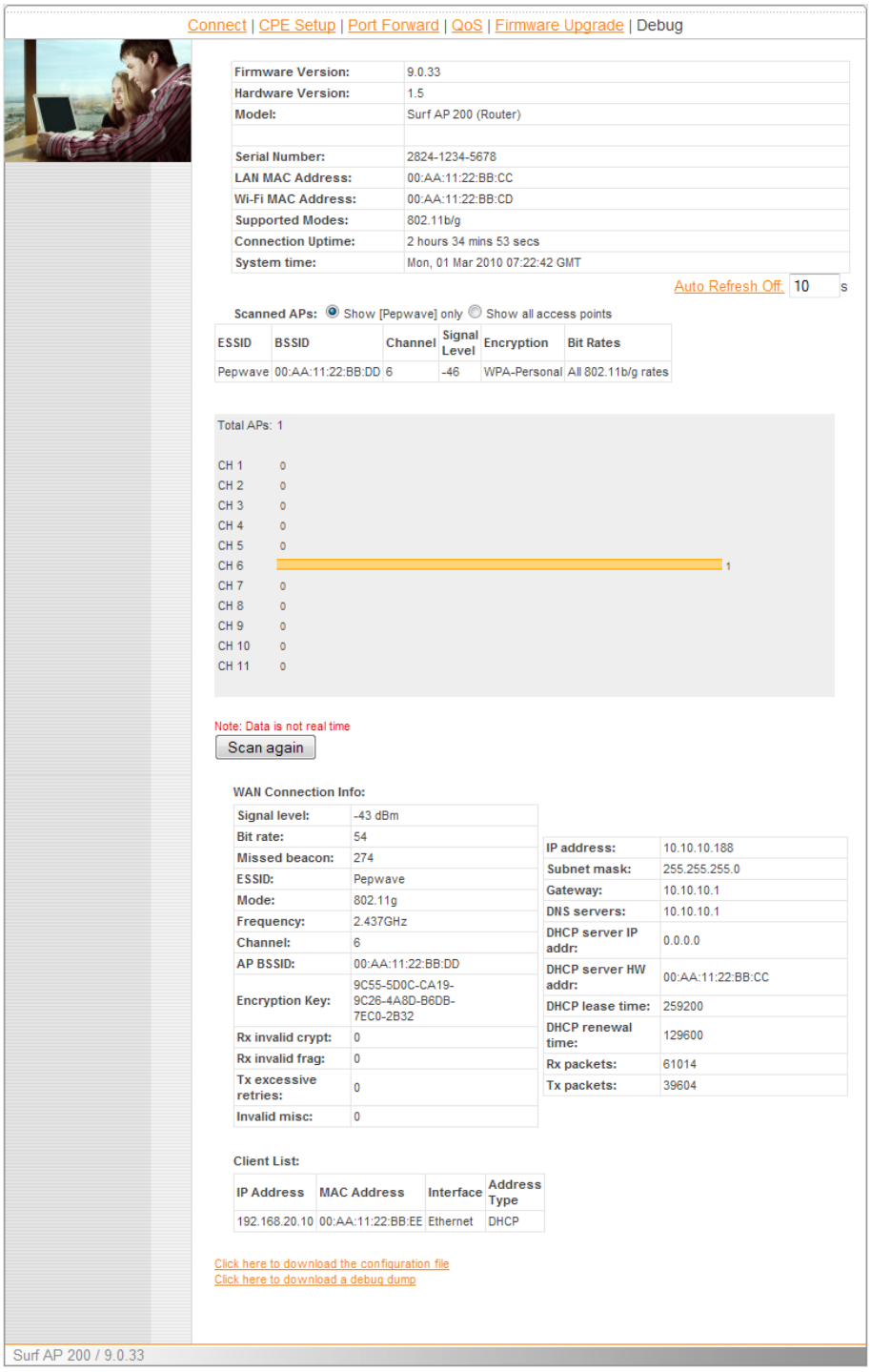
Connect | CPE Setup | Port Forward | QoS | Firmware Upgrade | Debug
Firmware Version: 9.0.33
Hardware Version: 1.5
Model: Surf AP 200 (Router)
Serial Number: 2824-1234-5678
LAN MAC Address: 00:AA:11:22:BB:CC
Wi-Fi MAC Address: 00:AA:11:22:BB:CD
Supported Modes: 802.11b/g
Connection Uptime: 2 hours 34 mins 53 secs
System time: Mon, 01 Mar 2010 07:22:42 GMT
Auto Refresh Off: 10 s
Scanned APs: Show [Pepwave] only Show all access points
ESSID BSSID Channel Signal Level Encryption Bit Rates
Pepwave 00:AA:11:22:BB:DD 6 -46 WPA-Personal All 802.11b/g rates
Total APs: 1
CH 1 0
CH 2 0
CH 3 0
CH 4 0
CH 5 0
CH 6 1
CH 7 0
CH 8 0
CH 9 0
CH 10 0
CH 11 0
Note: Data is not real time
Scan again
WAN Connection Info:
Signal level: -43 dBm
Bit rate: 54
Missed beacon: 274
ESSID: Pepwave
Mode: 802.11g
Frequency: 2.437GHz
Channel: 6
AP BSSID: 00:AA:11:22:BB:DD
Encryption Key: 9C55-5D0C-CA19-9C26-4A8D-B6DB-7EC0-2B32
Rx invalid crypt: 0
Rx invalid frag: 0
Tx excessive retries: 0
Invalid misc: 0
IP address: 10.10.10.188
Subnet mask: 255.255.255.0
Gateway: 10.10.10.1
DNS servers: 10.10.10.1
DHCP server IP addr: 0.0.0.0
DHCP server HW addr: 00:AA:11:22:BB:CC
DHCP lease time: 259200
DHCP renewal time: 129600
Rx packets: 61014
Tx packets: 39604
Client List:
IP Address MAC Address Interface Address Type
192.168.20.10 00:AA:11:22:BB:EE Ethernet DHCP
Click here to download the configuration file
Click here to download a debug dump
Surf AP 200 / 9.0.33

Illustration 17: Debug tab showing the system information

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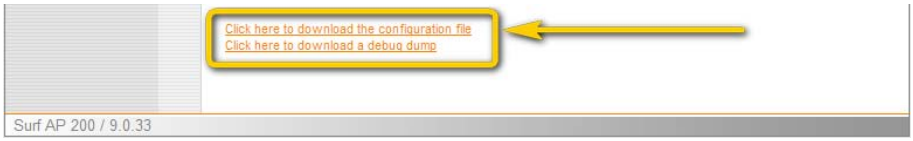
Tip

Debug dump and **configuration file** can be downloaded through clicking the links illustrated above. If you encounter issues and would like to contact Pepwave Support Team (email: support@pepwave.com), please download the above files and attach it along with a description of your encountered issue.



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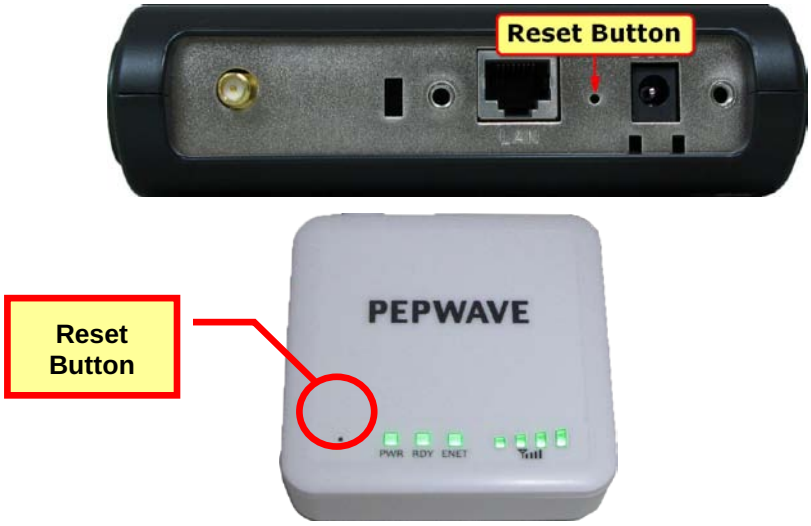
10 Restore to Default Settings

10.1 Surf Indoor Series

There are two ways to restore the Pepwave Surf Indoor unit to default settings.

If you are able to access the web admin interface, go to the ***CPE Setup*** page, and click the **Restore and Reboot** button.

Otherwise, you can also power up the unit and wait for about 1 min. Then press the **Reset** Button at the rear side of the unit using a pin and then hold it for 5 seconds. The unit will restore the settings to factory default and reboot.



10.2 Surf DX Series

There are two ways to restore the Pepwave Surf DX to default settings.

If you are able to access the web admin interface, go to the ***CPE Setup*** page, and click the **Restore and Reboot** button.

Otherwise, you can also power up the Surf DX unit and wait for about 1 min. Then push the **Reset** Button at the panel side of the unit and then hold it for 5 seconds. The unit will restore the settings to factory default and reboot.

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Appendix

Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

1) Reorient or relocate the receiving antenna.
2) Increase the separation between the equipment and receiver.
3) Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
4) Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

IMPORTANT NOTE

FCC Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

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Broadband Possibilities

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